PUBLIC HEALTH REPORTS

VOL. 31 DECEMBER 29, 1916. No. 52

PREVENTION OF SMALLPOX.

POWER OF STATE AND LOCAL BOARDS OF HEALTH TO REQUIRE VACCINATION OF SCHOOL CHILDREN.

The County Board of Health of Henry County, Ky., attempted to enforce a rule of the Kentucky State Board of Health, which required all teachers and pupils in the public schools to be vaccinated against smallpox at least once every seven years.

Suit was brought to prevent by injunction the enforcement of the rule, which seems to have been violently opposed in at least one school district.

The Court of Appeals of Kentucky decided that a matter of such vital importance to the community should not be left to the whim of individuals, and the action of the board of health was sustained.

The opinion is printed in full in this issue of the Public Health Reports, page 3551.

PUBLIC HEALTH ADMINISTRATION IN COLORADO.

By CARROLL FOX, Surgeon, United States Public Health Service.

The following report gives the results of a study of public health organization and administration in the State of Colorado, carried on through a period of approximately two months from September 19, 1916, to November 23, 1916.

Colorado has an area of 103,948 square miles, contains 63 counties, and has a population, estimated as of July 1, 1916, of 962,060.

The State is traversed from north to south by a part of the range of the Rocky Mountains, so that much of its territory is at a high elevation, Denver, the principal city, having an altitude of 5,183 feet. It is only in the extreme eastern portion of the State that the elevation falls below 5,000 feet.

The climate is dry and particularly beneficial in the treatment of pulmonary complaints, especially pulmonary tuberculosis.

The principal industries of the State are cattle raising, mining, and farming in the irrigated districts as well as some dry farming. Denver and Pueblo are the manufacturing centers of the State.

For information and assistance obtained during the study, the writer is indebted to the officials of the State board of health as well as to other State and local officials.

STATE BOARD OF HEALTH.

Composition of the board.—The State Board of Health of Colorado consists of nine members appointed by the Governor, the term of office of three expiring every two years. Every two years the board elects from among its members a president, a secretary, and a treasurer.

Meetings.—The board is required to meet at least semiannually at Denver, and at such other places and times as it may deem expedient. By authority of by-laws which it has adopted the board meets once each month at the call of the president.

Salaries and expenses.—The members of the board of health, with the exception of the secretary, receive no salary, but are entitled to remuneration for actual expenses incurred while traveling on official business.

Powers and duties.—The powers and duties of the State board of health are:

To have general supervision over the interests of health and life of the citizens of the State.

To study the vital statistics of the State and make profitable use of the collected records.

To study the influence of climate on disease and health in different localities of the State.

To make sanitary investigation and inquiries regarding causes of disease, and the effect on the health of the people of localities, employment, conditions, ingesta, habits, and circumstances.

To advise with other officials in regard to the location, drainage, water supply, disposal of excreta, and the heating and ventilation of any public building.

To recommend from time to time standard works on subjects of hygiene to be used in the schools of the State.

To license hospitals, lying-in hospitals, dispensaries, or other institutions for the treatment and care of the sick and injured.

To furnish suitable blanks to local authorities and physicians on which to make reports required by the State board of health or by law.

To call on local executives to appoint persons to serve as local health officers, the local health officer to act in cooperation with and under the advice of the State board of health.

To assume all powers conferred upon the local board of health when such board fails or refuses to act in matters concerning public

health or to bring suit against the local health authorities for neglect of duty. The expense involved must be borne by the locality.

To prevent the introduction into the State of cholera or other dangerous disease by establishing a system of inspections for the purpose of determining the presence of such disease in immigrants or travelers, wearing apparel, etc. The inspector so appointed is authorized to administer oaths, and under the authority of the State board of health may order the disinfection of baggage and may isolate persons suspected of carrying infection by placing them in care of local boards of health or by using other practical methods.

To make and publish the necessary rules for the conduct of inspections. Any person violating these rules is liable to a fine of not less than $25 nor more than $300 for every offense.

To make the necessary by-laws and regulations for its own government. Any member who fails to obey such regulations is subject to removal on a vote of a majority of the members of the board. The office is then declared vacant by the governor, who appoints another person to the vacancy.

The secretary of state is required to provide a suitable office for the board of health and its secretary and the necessary stationery and printing.

Duties of the secretary.—The secretary of the board is required to keep his office in Denver and to perform all duties prescribed by law or required by the board of health. In part, these require him to keep a record of the transactions of the board; to have custody of all books, papers, or other documents belonging to the board; to communicate with other State boards of health and with local boards within the State; to file all reports and correspondence; to prepare and forward such blank forms of returns as may be required; to collect and disseminate information among the people by annual report or otherwise.

Personnel.—The personnel of the State health organization (exclusive of the members of the board), with their respective salaries, is at present as follows:

Secretary State board of health (part time)	$1,000
Medical inspector (part time)	900
Bacteriologist (part time)	1,500
Clerk, vital statistics	1,200
Assistant statistician	1,200
Transcribing clerk	1,200
Commissioner of pure food	2,000
Drug inspector	1,500
Food inspectors (three), at $1,200	3,600
Clerk and stenographer	1,200
	15,300

Office hours.—The office hours of the State board of health are from 9 a. m. to 5 p. m., with one hour for lunch. During Saturday afternoons there is but one employee on duty, and on Sundays and holidays the office is closed.

Requisitions, vouchers, and files.—The State board of health has little authority over its expenditures. Before any expense can be incurred, even for traveling, permission must be obtained from a majority of the members of the auditing board, which is composed of the governor, State treasurer, State auditor, secretary of state, and the attorney general.

In the case of traveling expenses, requisitions are made out at the beginning of each month for the probable sum to be needed and approval is obtained to expend not to exceed that amount.

When articles are to be purchased from the incidental fund, requisitions are addressed to the secretary of state and vouchers are made out in his office. When the purchase involves printing or stationery, the requisition must be approved by the commissioner of printing before it goes to the auditing board. In such cases vouchers are likewise made out in the office of the secretary of state.

In the case of traveling expenses, salaries, or expenses to be paid out of the "Laboratory Fund," requisitions are returned to the State board of health after approval by the auditing board, and vouchers made out in the office of the board of health for transmission to the auditor.

The scheme of filing letters is somewhat antiquated and should be changed to conform to a modern system.

Discussion.—The secretary of the State board of health is a part-time official and is elected by the board from among its members. As secretary he retains his membership on the board. As a member of the board he is appointed by the governor for a term of six years, at the expiration of which he may, for political reasons, fail of reappointment, and the board may lose a good secretary. The law should therefore be amended to provide for this contingency. An executive officer of a State board of health or State health officer should hold his position so long as he continues to render efficient service to the State.

The health officer should also be placed on a full-time basis and should receive a salary which would be commensurate with the importance of his duties and relieve him of the necessity of engaging in the private practice of medicine in order to gain a livelihood. Experience has shown that the work of a health officer and the practice of medicine are incompatible. A man can not serve his government and his patients and do justice to either.

In addition to the above it is necessary for reasons of efficiency and ease of administration to organize within the State board of health certain divisions to carry on specific duties, each division to be in

charge of a full-time chief working under the supervision of the State health officer.

The entire personnnel of the State health organization should hold office during efficiency and not be discharged on account of political considerations.

Larger quarters hould be furnished in the statehouse to accommodate the State board of health, such quarters to include space for a laboratory.

There is probably sufficient general law to accomplish all that is desired, provided the State board of health is given the money and men to carry on the work.

REGISTRATION OF BIRTHS AND DEATHS.

The law for the registration of births and deaths in the State of Colorado was enacted in 1907, and is patterned closely after the model law proposed by the United States Bureau of the Census.

This act establishes in the State board of health a bureau of vital statistics and makes the secretary of the board State registrar of births and deaths.

A registration district is defined as a city, an incorporated town, or a county exclusive of the cities and incorporated towns within its boundaries, and it is required that a local registrar be appointed in each registration district.

Provision is made for the appointment of deputy and subregistrars and for the payment of 25 cents to local registrars for each birth or death certificate filed with the State registrar. The fees are paid by the local authorities upon the certification of the State registrar.

As the provisions of law are similar to those in many other States, a further summary is deemed unnecessary.

Registration of deaths.—During the 12 months' period ended June 30, 1916, there were registered with the State registrar 10,603 deaths, exclusive of stillbirths, making a death rate for the State of 11 per 1,000.

It is well known that many tuberculous patients visit the State for the benefit to be derived from its climate, and in order to arrive at a death rate comparable to that of most other States it would therefore seem fair to exclude deaths from tuberculosis where the disease was contracted outside of the State of Colorado. From the information contained on the death certificates it was learned that 892 deaths were registered from tuberculosis contracted elsewhere. Subtracting this figure from the total number of deaths there will remain 9,711 deaths from all causes, which gives a corrected death rate of 10 per 1,000.

In order to determine approximately whether the State is securing satisfactory death registrations, figures were computed for six of the cities of the State where it is believed that practically all, if not all,

deaths are recorded. These figures, estimated as of July 1, 1916 (stillbirths excluded), are shown in the following table:

Locality.	Population.[1]	Total number of deaths.	Crude death rate per 1,000.	Number of deaths pulmonary tuberculosis contracted outside of State.	Number of deaths corrected from last column.	Death rate per 1,000.	Number of births.	Birth rate per 1,000.	Still births.
Denver		3,197	12.2	379	2,818	10.8	3,580	13.7	141
Pueblo		504	9.2	29	475	8.7	493	9.0	23
Colorado Springs		512	15.5	125	387	11.7	442	13.4	21
Trinidad		167	12.0	4	163	11.7	261	18.8	4
Boulder		159	13.5	19	140	11.9	169	14.4	5
Greeley		120	10.5	11	109	9.5	78	6.8	9
Total		4,659	12.0	567	4,092	10.6	5,023	13.0	203
State	962,060	10,603	11.0	892	9,711	10.0	13,673	14.2	522

[1] The calculations were based on population figures of the United States Bureau of the Census, estimated as of July 1, 1916.

It will be seen that these cities had, collectively, 4,659 deaths from all causes, making a death rate of 12 per 1,000, as against a death rate of 11 for the State as a whole.

After correcting for deaths from tuberculosis contracted outside of the State, the same cities had 4,092 deaths from all causes, giving a death rate of 10.6 per 1,000, which is about six-tenths higher than the death rate for the State as a whole after making the same correction.

It is therefore thought quite proper to assume that practically all of the deaths occurring in the State are registered.

Death certificates are indexed by the card system and bound annually.

Preventable diseases.—From information contained in the death certificates it was determined that 5,851 deaths might be classed as preventable. This figure represents 55 per cent of the deaths from all causes. The following table gives this information more in detail, together with other pertinent data.

Disease.	Number of deaths registered, all ages.	Indicated death rate per 100,000.	Number of cases reported.	Indicated fatality rate per 100 cases.	Number of deaths registered under 1 year.
Tuberculosis, pulmonary	1,440	149.6	32	.....	4
Tuberculosis, other forms	111	11.5	0	.....	10
Typhoid fever	111	11.5	533	20.8	2
Diphtheria	44	4.5	419	10.5	2
Whooping cough	67	6.9	671	9.9	41
Scarlet fever	59	6.1	1,121	5.2	2
Smallpox	1	.....	73	1.3	1
Measles	29	3.0	3,486	.8	5
Chicken pox	0	.0	1,138	.0	0
Mumps	0	.0	261	.0	0
Pneumonia	1,151	119.6	.....	.....	202
Syphilis	96	9.9	.....	.....	15
Influenza	194	20.1	.....	.....	12

Disease.	Number of deaths registered, all ages.	Indicated death rate per 100,000.	Number of cases reported.	Indicated fatality rate per 100 cases.	Number of deaths registered under 1 year.
Meningitis, exclusive of tubercular	86	8.9	.....	.....	12
Septicemia, including puerperal	116	12.1	.....	.....	6
Tetanus	8	.8	.....	.....	2
Rocky Mountain spotted fever	4	.4	.....	.....	0
Erysipelas	43	4.4	.....	.....	23
Diarrhea and enteritis	309	32.1	.....	.....	212
Other infections	102	10.6	.....	.....	14
Diseases and injuries due to occupation	164	.....	.....	.....	0
Other accidents	408	42.4	.....	.....	6
Pellagra	3	.....	.....	.....	0
Scurvy	1	.....	.....	.....	1
Malignant growths	516	53.6	.....	.....	0
Premature births	386	.....	.....	.....	386
Congenital debility, inanition, convulsions, etc	115	.....	.....	.....	115
Other causes peculiar to early infancy	287	.....	.....	.....	287
Total	5,851	.....	.....	.....	1,360

Infant mortality.—There were recorded in the State board of health during the same period 1,360 deaths of infants under 1 year of age, practically all of which may be classed as preventable. This figure represents 23 per cent of the total preventable deaths and gives an indicated infant mortality rate for the State of 99.4 per 1,000 births. This infant mortality rate, however, is not the true rate and would be lowered by securing more adequate birth returns.

Registration of births.—There were registered with the State registrar during the 12 months' period ended June 30, 1916, 13,673 births, making a birth rate of 14.2 per 1,000. It is hardly likely that this figure represents the true birth rate of the State. It indicates rather that there are a number of births occurring which are not reported—a supposition borne out by information obtained from several localities during the course of this study. It must be stated, however, that more recently an improvement has been noted as regards the number of births reported. This is due to increased correspondence and similar activity in the office during the last few months. When the State board of health is provided with adequate means to carry its activities into the field, a very material increase in birth returns may be expected.

Birth certificates are bound annually but not indexed.

EPIDEMIOLOGICAL ACTIVITIES.

There are engaged in the epidemiological activities of the State board of health a medical inspector and a bacteriologist.

The medical inspector is a part-time official, the salary allowed by law being inadequate to pay for full-time services. In addition to epidemiological work, the inspector is required to act as sanitary engineer for the State board of health.

The bacteriologist is likewise a part-time official.

Report of Diseases.

Requirements of laws.—Every physician is required to report immediately to the local board of health every case of smallpox, cholera, diphtheria, scarlet fever, or any other disease dangerous to the public health coming under his care. Such report includes the name of the disease, the name, age, sex, and address of the patient, and the name of the physician. A physician who refuses or neglects to file such report is liable to a fine of not less than $5 nor more than $100.

The same report is required from the householder where a disease dangerous to public health exists within the household, and if he refuses or neglects to give such notice he is liable to a fine of not to exceed $100.

Physicians are required to report every case of tuberculosis coming under their care to the local health officer within 24 hours on blank forms furnished for the purpose by the State board of health. Similar reports are required from those in charge of hospitals or other similar institutions. The information to be contained in the reports must be as follows: Name, color, age, nativity, sex, occupation, place where last employed, present address, part of body affected, stage of disease, and the evidence on which the diagnosis of tuberculosis is based.

When any railroad conductor discovers on his train a person suffering from cholera, smallpox, diphtheria, scarlet fever, or other contagious disease, he must communicate with the railway official nearest to the point at which the case is discovered, who in turn must give the same information to the nearest member of the State board of health or local health officer.

Requirement of regulations.—Regulations of the State board of health promulgated February 7, 1916, require that the following-named diseases be reported:

Actinomycosis.
Anthrax.
Chancroid.
Chicken pox (varicella).
Cholera (Asiatic).
Dengue.
Diphtheria.
Dysentery, amebic and bacillary.
Erysipelas.
Favus.
Foot and mouth disease (aphthous fever).
German measles.
Glanders (farcy).
Gonococcus infection.
Hookworm disease (uncinariasis).
Impetigo contagioso.
Leprosy.
Malaria.
Measles.
Meningitis, epidemic cerebrospinal.
Mumps.
Ophthalmia neonatorum.
Paragonimiasis.
Paratyphoid fever.
Plague.
Pneumonia.
Poliomyelitis, acute.
Puerperal septicemia.
Rabies (hydrophobia).
Relapsing fever.
Rocky Mountain spotted or tick fever.
Scabies (itch).
Scarlet fever.
Septic sore throat.
Smallpox (variola).
Syphilis.
Tetanus.
Trachoma.
Trichinosis.
Tuberculosis.
Typhoid fever.
Typhus fever (Brill's disease).
Whooping cough (pertussis).
Yellow fever.
Cancer.
Pellagra.
Arsenic poisoning.
Brass poisoning.
Carbon dioxide poisoning.
Carbon monoxide poisoning.
Carbon bisulphide poisoning.
Cyanide poisoning.
Dinitrobenzine poisoning.
Illuminating or fuel gas poisoning.
Lead poisoning.
Mercury poisoning.
Naphtha poisoning.
Poisoning by nitric-oxide fumes.
Silver poisoning.
Wood-alcohol poisoning.

In addition to the above a regulation provides more specifically for the reporting of diseases by physicians and by others when no physician is in attendance. The latter includes superintendents of hospitals, sanitariums, dispensaries and other institutions, nurses, midwives, teachers, dairy managers, heads of households and keepers of hotels or boarding houses, etc.

A regulation also requires that local health officers make a copy of the morbidity reports received by them and forward the originals to the State board of health without delay.

Methods of procedure.—A form has been devised on which to report diseases in accordance with the regulations and which at the same time serves to record a brief epidemiological history of the case. Upon the receipt of a report the information is transcribed into loose-leaf ledger and then filed. At the end of the year this information is tabulated and published in the annual bulletin.

The form of the morbidity report differs from the forms used in other States in that it is not post card size and must be inclosed in an envelope for transmission. It now has a wide distribution among the doctors of the State and should be productive of good results as regards the reporting of diseases. In fact, even in the brief space of time during which the regulations have been in effect and the new form in use, there has been a decided improvement in the reports.

Control of Diseases.

Requirements of laws.—In addition to the laws specifying the powers and duties of the State board of health which have already been summarized, and those laws pertaining especially to the powers and duties of local authorities which will be summarized later, the following provisions of law relate to the control of diseases by State authorities.

In the case of suspected tuberculosis, local health officers are authorized to make microscopical examinations of sputum or other discharges for practicing physicians, specimens to be submitted in packages supplied by the State board of health and to be accompanied by blank forms filled out with certain necessary data. The paragraph of the act containing this provision ends in the clause, "provided that the examination provided for in this section" shall be by the State board of health.

The local health officer is required to record the information contained in a report of tuberculosis, together with the results of examination for tubercle bacilli, in a register furnished by the State board of health. A copy of this register must be transmitted quarterly to the State board of health. The register is not open to inspection except by the health authorities of the State or of the locality.

When any apartment has been vacated by a patient suffering from open [1] tuberculosis, either by death or removal, the health

[1] An open case of tuberculosis is defined as one in which tubercule bacilli are found in the discharges.

officer must be notified and the apartment must be disinfected, cleansed, or renovated before it may be reoccupied.

When the directions of the local health officer are not obeyed within 72 hours, a notice must be placed on the door of the infected apartment or premises, containing the information that tuberculosis is a communicable disease and that the apartment has been occupied by a case of tuberculosis and can not be reoccupied until the order of the health authorities has been complied with.

Any tuberculous person who, after being properly notified by the health officer, disposes of his discharges in a way to jeopardize the life or health of others, is guilty of a misdemeanor.

Physicians attending patients suffering from tuberculosis are required to take all necessary precautions and to give the necessary instructions to prevent the spread of the disease. Where no physician is in attendance, such duties devolve upon the local health officer.

When a report of tuberculosis has been received, the local health officer is required to transmit to the attending physician a circular of information relative to the prevention and spread of the disease.

A physician who fails to report a case of tuberculosis, or who reports as afflicted with tuberculosis any person who is not so afflicted, or who willfully makes false statements relative to a case of tuberculosis, or as to the precaution taken to prevent the spread of the disease, is liable to fine of not more than $100.

Physicians are required to report the recovery of all cases of tuberculosis to the local health officer, who must record the same in the records of his office.

Any person violating any of these provisions is liable to a fine of not less than $5 nor more than $100.

Whenever a case of cholera or smallpox is suspected to exist on any train, the conductor must have it detained at the nearest station until the health authorities arrive to take charge of the case. The State board of health is authorized to order detention of any train or car for the purpose of making inspections.

The use of the common drinking cup in all hotels, sanitariums, theaters, public halls, schoolhouses, etc., or other institutions or conveyances frequented by the public is prohibited. A fine of not less than $5 nor more than $200 is provided.

In the case of an outbreak of a dangerous communicable disease in an institution, the commissioners may cause the removal of the inmates to places of security until the danger is past, when they must be returned.

Before any rags or other dangerous material may be sold or manufactured into articles to be sold, they must be disinfected. Such articles imported into the State and suspected of being infected must

not be opened until they can be subjected to immediate disinfection. The State board of health is authorized to prohibit the importation of such materials.

The governor is authorized, when necessary, to draw from the general fund an amount not to exceed $5,000 to be used by the State board of health in the control of cholera or other communicable disease dangerous to the public health.

Requirements of regulations.—The regulations of the State board of health adopted February 7, 1916, specify the methods to be used in preventing the spread of all of the communicable diseases required to be reported. These regulations are for the most part full and thorough and furnish an excellent guide to local health officers in handling the transmissible maladies. The tabulation shows briefly the methods to be used in controlling those diseases more commonly encountered.

In addition to the above the regulations also provide for the methods to be used by embalmers in handling bodies dead of communicable diseases, prohibit the removal of patients suffering from communicable disease without permission of the local health officer, or the removal of infected clothes or other articles without disinfection and the consent of the health officer; prohibit public funerals in the case of bodies dead of certain diseases; require the reporting of diseases in domestic animals which may be transmitted to man; specify the card to be used in placarding houses; prescribe disinfection and disinfectants; provide for the sanitation of hospitals, sanatoria, lying-in hospitals, and other similar institutions, and the sanitation of barber shops, laundries, and cleaning establishments; regulate the sale of second-hand goods, rags, etc.; provide for the sanitation of public conveyances, etc.

Methods of procedure.—In addition to a large amount of executive work performed through correspondence in assisting local health officers to handle certain situations, there is required a great deal of field work of which a part only can be attempted. This is due partly to the lack of adequate funds to defray traveling expenses and partly to an appropriation inadequate to pay the salary of a medical inspector for full-time services.

Notwithstanding this handicap, the part-time medical inspector was enabled to make 51 inspection trips during the 12 months' period ended June 30, 1916. For reasons of economy, visits are made to communities only when an emergency arises or at the urgent request of local authorities. Then the opportunity is taken to attend to as many matters as possible. During these trips of inspection the following investigations were made and duties performed on account of:

Typhoid fever	5
Smallpox	5
Diphtheria	1
Scarlet fever	5
Other diseases	4
Water supplies	7
Disposal of sewage	9
Disposal of industrial wastes	3
Institutions inspected	36
Addresses delivered	6
Nuisances	3
Sanitary surveys	6

In addition to the above there were 42 institutions inspected in the city of Denver.

Occasionally it is necessary to require a food inspector to make an inspection concerning matters not related to his regular work. This is done to save the expense of sending the medical inspector to a locality where the food inspector happens to be engaged in his legitimate duties.

After each inspection trip a report is made concerning the subjects under investigation and the action taken in each case.

Tuberculosis.—During the 12 months period ended June 30, 1916, there were registered with the State registrar 1,440 deaths from pulmonary tuberculosis, making a death rate of 149.6 per 100,000. Information contained on the death certificates indicates that of the above deaths 892 occurred in persons who contracted their infection outside of the State of Colorado and who had come to the State to be cured. Making the necessary correction there is therefore a death rate among those contracting the disease within the State of only 56.9 per 100,000, while a similar calculation for nonresidents gives a death rate from tuberculosis of 92.7 per 100,000. It is realized that statistics based on information contained in a death certificate are not always to be relied upon. Nevertheless it is thought that the above figures are a close approximation to the truth and bear out the facts as they are understood by persons in the State best qualified to know.

In addition to the above there were reported 111 deaths from tuberculosis other than pulmonary, making a death rate from tuberculosis, all forms, of 161.2 per 100,000.

The number of cases of tuberculosis is unknown. Morbidity reports on the subject are woefully lacking. Recently there has been some increase in the number of reported cases, but the majority of such reports have been received from nurses engaged in antituberculosis work. As regards the reporting of this as well as of other diseases, physicians frequently fail to realize their obligation to the State or the necessity of obeying laws or regulations.

Tabulation of methods used in the control of the more common communicable diseases.

	To be reported.	To be placarded.	Isolation of patient.	Quarantine of contacts.	Exclusion from school of contacts.	Terminal disinfection required.	Special precautions.
Diphtheria.....	Yes.....	Yes.....	Yes; for at least 21 days, or until two successive negative cultures are obtained after 14 days' isolation.	Adults may be permitted to carry on vocation if they do not come in contact with patient.	If shown to be immune by Schick test and throat cultures are negative, may be permitted to attend school. If not immune may attend after receiving immunizing dose of antitoxin and 10 days' observation.	Yes.....	
Scarlet fever....	Yes.....	Yes.....	Yes; for 35 days, or until all discharges have ceased.	Same as above and provided they do not come in contact with children or handle foods.	May be permitted to attend school, if immune, removed from house under quarantine and after 10 days' observation.	Yes.....	
Smallpox.....	Yes.....	No.....	In hospital if practicable for at least 3 weeks and until 10 days after exfoliation is complete.	Yes; for 14 days if not immune by reason of previous attack or recent successful vaccination or immediate vaccination and disinfection.	Yes; until 14 days from date of exposure.	Yes.....	
Chicken-pox....	Yes.....	Yes.....	Until exfoliation is complete.	Not if immune and do not come in contact with patient.	Not if immune and do not come in contact with patient.	Cleansing and airing.	
Measles.....	Yes.....	Yes.....	For ar least two weeks.....	Heads of families may come and go provided they do not come in contact with patient.	Not if immune and they do not come in contact with patient.	.....do.....	
Typhoid fever..	Yes.....	Yes.....	Yes.....	None; but no contact permitted to engage in work where food and drink is handled.	No.....	.....do.....	Disinfection of all discharges and strict personal cleanliness. Screening. Vaccination advised.

Except for the county hospitals and the poor farms, there are no State or local governmental institutions for the isolation of tuberculosis. There are, however, many private hospitals, sanitoria, or boarding houses where those suffering from that disease may remain if able to pay, and there are other institutions maintained by private charity. The State of Colorado does not wish to bar the tuberculous from its territory. Many of her useful citizens were once tuberculous, and if the tuberculosis problem in the State were one of public health only, it would give rise to no special concern. The serious problem arises when, to the public health aspect of the question, is added one of economics. From this standpoint, tuberculous immigrants may be divided into several classes, those having adequate funds or whose care is guaranteed; those who upon arrival in the State must secure employment, and those who, with or without means, arrive in the last stage of tuberculosis expecting to be cured in some miraculous fashion. In any case patients may or may not be accompanied by families dependent upon them.

When the nature of the employment requires the tuberculous wage earner to remain indoors, as in office work, he is not placed in the most desirable position to effect a cure, even in Colorado, and it is very probable that he would be as well off, if not better off, in his home town with friends and relatives. In this, as well as in the case of advanced tuberculosis, the death of the wage earner is liable to leave the family without support. It then becomes a charge on public or private philanthropy. Thus the community is obliged to support a family with which it is no way concerned except upon the principle that we must be kind to the "stranger within our gates." Here it may be stated that indigents in the advanced stage of tuberculosis not infrequently come to Colorado upon the advise of a physician. In giving such advice the physician is not just either to the patient or to the State of Colorado.

While it is true that the climate of Colorado is beneficial in tuberculosis, it is equally true that tuberculosis may be cured in any climate with plenty of fresh air and food of the right kind. That the disease is transmitted directly from the sick to the well; that after it is clinically demonstrable it is associated with a case fatality rate of not less than 10 per cent, and that it is present at all times in epidemic form must be conceded. It should, therefore, be handled as are other dangerous communicable diseases—namely, by isolation of the patient. To accomplish this it behooves every State, and counties in every State, to erect suitable buildings for the isolation of open cases of tuberculosis. Any plan to hasten the erection of such institutions is to be desired, and when they are provided it is not unlikely that in the majority of instances the tuberculous with a small or no income would prefer to make use of their county sanitoria rather than to become strangers in a strange land.

In time the State of Colorado and its counties must take part in a scheme contemplating a multiplicity of sanitoria if only to isolate those cases of tuberculosis occurring among its own citizens. For the present, the State is probably justified in not taking an action that might encourage an increase in the number of indigent tuberculous immigrants.

Typhoid fever.—During the 12 months' period ended June 30, 1916, there were reported to the State board of health 533 cases of typhoid fever with 111 deaths. The indicated death rate per 100,000 population is 11.5. The indicated case fatality rate is 20.8. This figure indicates that a number of cases of typhoid fever are not reported, not recognized, or concealed.

Diphtheria.—During the 12 months' period ended June 30, 1916, there were reported 419 cases of diphtheria with 44 deaths. The indicated death rate is therefore but 4.5 per 100,000. This is much below the average for the registration area. On the other hand, the rather high case fatality rate—namely, 10.5—would indicate that all cases are not reported or that there is a delay in the use of antitoxin. In the year 1909 the legislature appropriated to the State board of health the sum of $5,000 for the purchase and free distribution of diphtheria antitoxin. Unfortunately no use was made of this act, and it is believed that the amount appropriated has long since reverted to the treasury. There should be some arrangement whereby antitoxin could be easily made available to the poor, payment for the serum to be made by either the State or the locality. To facilitate matters, distributing stations should be designated in various parts of the State by the State board of health.

Pneumonia.—Next to tuberculosis the greatest number of deaths occurred from pneumonia. There were 1,151 deaths, giving a death rate per 100,000 of 119.6.

Occupational diseases and accidents.—During the 12 months' period ended June 30, 1916, there were 164 deaths due to accident or disease occurring as the result of occupation. The majority of these deaths were associated with the mining industry.

Diagnostic Laboratory.

The bacteriological work for the State board of health is performed by a part-time official who is also the bacteriologist for the city of Denver. In addition he operates a private laboratory. He receives from the State a salary of $1,500 per year. Examinations are made in the city laboratory, the State furnishing the culture media.

The bulk of the work done for the State board of health is on account of diphtheria. A few examinations have recently been performed to detect rabies in animals, and occasionally a search is made in cerebrospinal fluid for the presence of the meningococcus.

The result of an examination is reported by the bacteriologist to the attending physician, by telegraph if requested, and to the State board of health by whom the report is filed.

There are two mailing outfits in use. One, for the submission of material from the throat and nose in the case of diphtheria, consists of a sterile swab inclosed in a sterile test tube packed in an approved mailing case. These outfits are shipped by the State board of health to local health officers for distribution. The other outfit is used for transmitting water samples and is furnished by the State chemist from Boulder, Colo.

During the 12 months' period ended June 30, 1916, there was a total of 610 examinations, all made for diphtheria. Of these, 181 were positive and 429 negative. The cost of maintaining the laboratory during the same period was $1,684.94, which makes the average cost of each examination $2.76 Based on a total of 610 examinations and excluding Sundays, the average daily number of examinations was a little under two. This represents the examinations performed on behalf of the State board of health alone and does not include any work done for the city of Denver, for which the bacteriologist receives an additional salary from the city.

The tabulation of examinations submitted by the bacteriologist at the end of the year to the State board of health and the tabulation compiled from the records on file in the office of the secretary of the State board of health do not agree. This is because the bacteriologist has included in his yearly tabulation a few examinations of material from diphtheria suspects located in the suburbs of Denver. In such cases reports are not made to the State board of health. There were also made at the request of the city a number of examinations of swabbings from the throats of children who are to become inmates of institutions located within the city limits. A city ordinance requires this procedure. The results of such examinations are reported to the city, and the work should be credited to the city laboratory

Local Health Authorities.

Requirements of law.—The laws relating to the formation of local boards of health and the appointment of local health officers are summarized as follows:

The board o health in cities of the first class (15,000 or more population) is comprised of the mayor, the health commissioner or city physician and a member of the city council.

The county board of health is comprised of the county commissioners and the county clerk, who acts as clerk of the board. The board of health of any city, town, or village has exclusive and independent control within its own jurisdiction.

Unless otherwise provided for, the mayor and council or the trustees of an incorporated town or city are authorized to exercise the powers and perform all the duties of boards of health within their respective jurisdictions. In such parts of the county not represented by a town or city organization, the county commissioners are empowered to act in matters of public health.

Every board of health is required to appoint one or more physicians to be the health officer or officers of the county or town, as the case may be. Such local health officer holds his office during the pleasure of the board, which also establishes his salary or other compensation. When it is not possible to secure the services of well-educated and suitable physicians, the board may appoint some other person as health officer.

A local health officer, unless otherwise provided for by law, is entitled to receive from the locality compensation at the rate of not less than $2 per day while in the discharge of his official duties.

The following is a summary of the laws defining the powers and duties of local boards of health. The local board of health is authorized—

To promulgate regulations for the maintenance of the public health. These regulations must be advertised by publication in some local newspaper, if there be one; and if not, by posting them in five public places. Any person violating a regulation of the local board of health is liable to a fine of not to exceed $100.

To remove any person suffering with smallpox or other sickness dangerous to public health to a separate house, if it can be done without danger to his health, and to provide nurses and other assistants, to be paid by the locality, or to quarantine such person in his home, and to take such other measures as may be necessary.

To establish one or more hospitals for the isolation of persons suffering from smallpox or other disease dangerous to the public health. All such hospitals are subject to rules and regulations of the board of health or a committee appointed by such board. It is prohibited to locate such a hospital within 100 yards of an inhabited house situated in an adjoining county without consent of that county. All employees of such hospital are subject to rules and regulations promulgated by the board of health or committee appointed by it. Any physician or other person in any hospital, jail, etc., who violates any of the regulations made for the government of the same is liable to a fine of not less than $10 nor more than $100.

To provide immediately, as an emergency measure, a suitable hospital building, with necessary nurses and attendants, in which to isolate any persons suffering from smallpox or other disease dangerous to the public health when such disease makes its appearance in a community.

To use all possible care to prevent the spread of communicable diseases and to give to travelers public notice of infected places.

To issue permits for the removal of any infected article or sick person when it is thought safe and proper to do so.

To make suitable provision for vaccination against smallpox, under the direction of the board of health or the health officer.

To investigate, through the local health officer, every case of smallpox, diphtheria, scarlet fever, or other contagious disease dangerous to public health reported or suspected to exist. The local health officer, on behalf of the board of health, must take

prompt measures to prevent the spread of the disease—i. e., to vaccinate, isolate, placard, etc.

To establish quarantine grounds in a suitable place. Any two or more counties may join together to establish such a place for quarantining individuals. Any person violating any quarantine regulations promulgated by any local board of health under authority of law is liable to a fine of not less than $5 and not more than $500. Any expense incurred on account of any person or grounds under such quarantine regulations must be paid by the person or by the owner of the grounds.

To remove to some other place any person confined in a jail and suffering from any disease dangerous to the health of other inmates or individuals of the community and to keep such person until he is in a safe condition to be returned to jail. When a prisoner has been removed from a jail, a copy of the order directing him to be removed must be forwarded to the clerk of the district court.

To remove any individual of the poorhouse or hospital suffering from a dangerous contagious disease to a suitable place until such person is no longer dangerous to other individuals.

To enter any building, car, or train of cars in order to examine into causes affecting public health and if refused entrance, to make complaint to a justice of the peace, who is authorized to issue a warrant to a sheriff or constable to enter such building accompanied by any two members of the board of health between the hours of sunrise and sunset and abate any nuisance under the direction of the members of the board of health.

To disinfect baggage, clothing, or other goods suspected of being infected, or to remove the same to a safe place until they are, in the opinion of the board of health, free from infection. The authorized officer may break open any house, shop, or other place in the daytime to secure articles suspected of being infected. A reasonable charge for securing such articles, transporting and disinfecting them, must be borne by the locality.

To appoint inspectors to inspect passengers coming into the State from infected districts in other States, and if they are suspected of bringing with them any infection dangerous to the public health, to restrain their movements and direct them to return from whence they came. Any traveler disobeying the orders of the inspector is liable to a fine of not to exceed $300.

To make regulations respecting the importation of any article liable to convey infection. Any one bringing in an unauthorized article is liable to a fine of not to exceed $100.

To assign the location of any business detrimental to the public health. When any place or building so assigned has become dangerous to the neighborhood or travelers, the court may revoke the license.

To require, under certain conditions, the removal of any cemetery.

To examine into all nuisances, sources of filth, and causes of sickness that may be injurious to public health, and to abate, remove, or prevent such as the case may require.

To regulate the care and cleaning of privies or water-closets, or to declare that such places are nuisances and order the abatement thereof.

To order that all low-lying areas which are filthy or contain stagnant water, be filled, drained, or cleaned, or to tear down any building which is liable to fall and injure persons or property.

To abate nuisances when any person, corporation, or company neglects to do the same after the receipt of an order from the local board of health, and to recover the expense of abatement by an action of debt against the person or as a lien against the property.

To abate a nuisance when such nuisance is found on private property and the owner or occupant refuses to abate the same within 24 hours, the expense so incurred to be

paid by the owner or occupant of the property. For failure to abate a nuisance within 24 hours after the order is received, a person is liable to a fine of not to exceed $100. The law further provides for the abatement of nuisances by the court.

In addition to the above the law also make the following provisions

The county court or any justice of the peace of any county or town has jurisdiction in matters concerning nuisances.

The justice of the peace is authorized to issue a warrant directed to any sheriff or constable requiring him, under the direction of the local board of health, to remove any person suffering from contagious disease or to take possession of the house and provide nurses, attendants, etc., for the accommodation of the sick.

Nurses and attendants employed as above are entitled to just compensation from the locality. The owners of houses are also entitled to remuneration when houses or other possessions are taken by authorized officials.

Where the nature of a business by reason of its being a nuisance may injure any person either in his comfort or in the enjoyment of his estate, he may bring an action for damages against the owners of the business.

The owner of any dead animal is required to burn or bury the carcass at least 2 feet under ground. Any other disposition is a violation of the law and subjects the owner to a fine of not less than $10 nor more than $30, or, in default of payment thereof, to imprisonment of not more than 30 days, or both fine and imprisonment.

It is the duty of all physicians and clerks of local boards of health to make a report of their proceedings to the State board of health and any other facts that may be required by the State board of health.

It is likewise the duty of the above persons, as well as physicians or presidents of mining or other corporations, to forward to the State board of health, upon request, any information of interest from a public-health standpoint.

A law also provides for the sale of diseased meats or other foods liable to injure the health of the people of the locality, prohibits diseased animals to run at large, and requires those engaged in selling or manufacturing for sale antitoxin, vaccines, or other pharmaceutical products to make a report to the local board of health within 12 hours, stating to whom the product was sold and the date. For failure to report there is provided a fine of not less than $5 nor more than $20.

For the purpose of looking superficially into local health organization and administration the following-named cities were visited:

Denver, Denver County.
Colorado Springs, El Paso County.
Pueblo, Pueblo County.
Trinidad, Las Animas County.
Boulder, Boulder County.
Fort Collins, Larimer County.
Greeley, Weld County.

The following is a brief statement of the public-health activities in these localities as well as the personnel engaged.

Denver.—The personnel consists of the head of the health department, who is also head of the department of charities and is known as "manager of health and charities." In addition there are engaged in public health work, 1 deputy health commissioner (vacant), 1 registrar of vital statistics, 1 secretary, 1 clerk, 1 janitress, 1 medical inspector, 2 fumigators, 2 quarantine officers, 1 chief bacteriologist, 1 assistant bacteriologist, 1 chemist, 2 laboratory attendants, 1 chief of milk-inspection division, 1 creamery inspector, 1 milk-depot inspector, 2

dairy inspectors, 1 food inspector, 1 drug inspector, 7 meat inspectors, 5 dump guards, 2 police surgeons, 2 city physicians, and the employees at the county hospital, county poor farm, and isolation hospital.

Activities.—The activities carried on by the health department are chiefly concerned with the control of communicable diseases, the inspection of foods, including milk and meats, the collection of vital statistics, and the maintenance of a bacteriological and a chemical laboratory.

In the control of the milk supply, supervision is maintained over the producing farm, pasteurizing plants, depots to which milk is brought in from the surrounding counties, and creameries or plants dealing in milk and manufacturing milk products.

There are six pasteurizing plants in the city. There is no ordinance requiring the pasteurization of milk. Both the holding and the flash system are used. Milk must be sold in original packages and places selling milk must be licensed. The standard for milk is that it shall not contain more than 500,000 bacteria nor more than 10,000 colon bacilli, or 10,000 streptococci per cubic centimeter.

About 30 per cent of the cases of communicable disease occurring in the city are taken to the isolation hospital and the rest are quarantined at home. The usual methods are pursued as to placarding, fumigation, etc. In the case of diphtheria, cultures are required for diagnosis, from contacts, and for the release of quarantine. No child may return to school until the throat has been free from diphtheria bacilli for two weeks. Before a child may become an inmate of an institution a culture is taken from the throat and nose to exclude diphtheria.

The isolation hospital is built of brick on the pavilion plan and will accommodate 100 patients. It is used for the isolation of all communicable diseases, but more especially diphtheria, scarlet fever, and erysipelas. Patients suffering from tuberculosis are taken to the county hospital and the poor farm.

The inspection of foods includes the ante and post mortem examination of animals killed in local slaughterhouses not under Government supervision, and the inspection of all places handling meats or other foods.

The work of the bacteriological laboratory consists of the examination of swabs for suspected diphtheria or carriers and the examination of milk and water.

In addition to the above it may be said that there is a partial school inspection. The school authorities employ one physician but no nurse. The bulk of the examinations are made by the teachers under the authority of State law. Many pupils are referred to the city physicians of the health department for advice. The work of the city physicians is therefore of a public health as well as of a

charitable nature. Many pupils of the public schools are rendered surgical and medical relief at the county hospital.

The rubbish collected in the city is used as a fill. To supervise the dumping of this material, the city health department employs five men.

Garbage is collected by private contract and after sterilization is fed to hogs. Dead animals are collected by private contract.

Sewage is emptied into the Platte River untreated. The city is well sewered and the ordinance requiring sewer connections is enforced.

The water supply is owned by a private corporation. There are four treatment plants. At one, slow sand filtration is used; at another, rapid sand filtration and hypochlorite; at another, sedimentation and chlorinization, and at another, water is filtered through galleries.

The total appropriation for the maintenance of the public health during the present year is $66,540, with $23,380 additional to maintain the isolation hospital. The total salary list for the health department is $59,600, including $11,600 for employees at the isolation hospital. The amount appropriated for the county hospital is $170,234 and for the county poor farm $34,420.

There are 12 inspectors employed by the city who are not in the health department and who perform not only sanitary inspections but inspections relative to fire protection, construction of buildings, plumbing, etc.

The department of health and charities also maintains a corps of "investigators," who determine the status of indigents applying for financial relief. Duties of this nature are especially necessary in Denver on account of the seriousness of the tuberculosis problem from the economic standpoint. There is also a district nurse association in Denver supported by private philanthropy.

Colorado Springs.—The personnel consists of 1 health officer, who is a part-time official and who receives a salary of $150 per month; 1 bacteriologist and chemist, 1 clerk, 3 sanitary inspectors, 1 market inspector, 1 assistant market inspector, 1 plumbing inspector, and 1 superintendent of the garbage dump and assistant plumbing inspector.

Activities.—The activities carried on by the health department are those concerned with the control of the communicable diseases, the registration of births and deaths, the inspection of foods, including milk, the operation of a diagnostic and chemical laboratory and plumbing inspection.

The health officer is the local registrar.

Dairy inspection is carried on by the market inspector and his assistant.

In addition to the above it may be said that garbage is collected under contract, boiled, and fed to hogs.

Manure must be collected from May 1 to November 1 three times per week. It is dumped and burned.

There are two isolation hospitals—one for smallpox and another for other communicable diseases.

The water supply is obtained from a mountain stream and is untrea ed except by settling.

The sewage from the city passes into a creek untreated.

There is no school inspection, but a nurse is employed by the board of education, and the health department has maintained a dental clinic a which school children may receive free treatment.

There was appropriated for the health department the sum of $14,000 for the year 1916.

Pueblo.—The personnel consists of 1 health officer, who is a part-time official and who receives a salary of $150 per month; 1 assistant health officer, 1 bacteriologist, 1 food inspector, 2 sanitary inspectors, 1 plumbing inspector, and 1 clerk.

Activities.—The activities engaged in by the health department are concerned with the control of communicable diseases, the registration of births and deaths, the inspection of foods, including milk, restaurant inspection, plumbing inspection, rooming-house inspection, and the maintenance of a bacteriological laboratory.

The health officer is the local registrar.

The inspection of milk and dairies is carried on by the food inspector, who is a veterinarian. There is one pasteurization plant in the city, which is inspected by the health department.

There is no school inspection, but the board of education employs 2 nurses, and children with defects are referred to the health department.

In addition to the 2 school nurses, the associa ed charities of the city and the Colorado Fuel & Iron Co. each employs one nurse.

There is an isolation hospital for the common communicable diseases maintained in connection with a private hospital, but no hospital for the isolation of smallpox.

Garbage is collected under private contract and is fed to hogs.

The water supply is obtained from the Arkansas River and is treated by coagulation with sulphate of iron and lime, and chlorinated, and then undergoes sedimentation in five basins.

Sewage is passed into the Arkansas River untreated.

For the year 1916 the health department received $13,500.

Trinidad.—The personnel consists of 1 health officer, who is a part-time official and receives a salary of $60 per month. He has no assistants. There are, however, employed by the city 4 other persons who are engaged in work of a public-health nature, but who

are independent of the health officer. These employees are 1 dairy inspector, 1 chemist, 1 plumbing inspector, and 1 policeman who acts as sanitary inspector.

Activities.—The health officer is local registrar and is engaged in the control of the communicable diseases. The city and county maintain a hospital for the isolation of smallpox.

Garbage is collected by the city scavenger service and fed to hogs.

Water is obtained from a mountain stream and undergoes no treatment. The watershed is owned by the city and the United States Government.

Sewage is emptied upon a ranch, untreated. There is no special appropriation for the health department.

Boulder.—The personnel consists of 1 health officer, who is a part-time official and receives $100 per month. He has 1 assistant—a sanitary inspector, employed during the summer months only.

Activities.—The activities of the health department of the city are carried on personally by the health officer, and include the registration of births and deaths, milk inspection, a partial school inspection, and diagnostic work performed in the laboratory of the University of Colorado.

There is one nurse employed by private charity.

Garbage is collected under private contract and fed to hogs.

City water is obtained from a mountain stream and undergoes no treatment.

The sewage of the city is settled, then emptied into a creek.

The isolation hospital is owned by the University of Colorado.

The health department received $1,800 for the year 1916.

Fort Collins.—The personnel consists of one health officer, who is a part-time official and receives a salary of $40 per month, and one milk and dairy inspector.

Activities.—The activities carried on by the local health officer are concerned with the control of communicable diseases and the inspection of milk and dairies.

There is no isolation hospital proper, but the county furnishes a building in which to isolate smallpox.

The water supply is obtained from a mountain stream, filtered and then treated with chlorine.

Garbage is collected by the city and is fed to hogs. The city furnishes the garbage can.

Sewage is emptied into the river untreated.

Greeley.—The personnel consists of one health officer, who is a part-time official and receives a salary of $50 per month and $2 for each terminal disinfection; one sanitary inspector; and one medical inspector for school inspection.

Activities.—The activities carried on by the health organization of Greeley are concerned with the control of communicable disease, milk and dairy inspection, school inspection, and diagnostic work, which the health officer performs in his own laboratory.

The inspection of dairies is also made personally by the health officer.

The water supply is obtained from a mountain stream and undergoes sedimentation and filtration.

Sewage is used for irrigation in summer and in winter empties into a stream untreated.

Garbage is collected by the city and fed to hogs.

The isolation hospital is owned by the county and is used to isolate various communicable diseases.

County organization.—In each county there is a health officer, who frequently acts as county physician as well. A large part of this work is performed in connection with the office of county physician. In some counties there have also been appointed one or more assistant county health officers, located in different parts of the county.

Discussion.

The epidemiological work of a board of health is its most important function, and in order that the State board of health of Colorado may be placed in a position adequately to perform work of this nature as well as to bring it up to the standard of modern health departments, both the medical inspector and the bacteriologist should be placed on a full-time basis. There should then be organized a division of epidemiology, to be placed in charge of the medical inspector under the supervision of the State health officer.

Under the present arrangement the diagnostic laboratory is of very little utility to the State. It should be made a part of the division of epidemiology and its scope should be materially broadened and made to include the examinations necessary to determine the presence of typhoid fever, paratyphoid fever, tuberculosis, intestinal parasites, gonorrhea, and the bacteriological examination of milk and water.

The laboratory itself should be moved to the same building which houses the rest of the State board of health, so that for administrative purposes it may come directly under the supervision of the State health officer. The State board of health has in storage a certain amount of material which could be used as part of the equipment of a new laboratory. Additional equipment would be necessary and could be purchased at no great cost.

It is thought that a district health organization for the State is not necessary at this time.

In regard to tuberculosis, it would seem only fair to those States which, because of their climate, receive tuberculosis patients from all parts of the country to make some provision whereby the migration of the tuberculous would be restricted and a community made responsible for the maintenance of its own citizens afflicted with the disease. However, laws to that effect could not be enforced with justice to all concerned until other laws requiring the registration of all cases of tuberculosis were enacted and strictly enforced in all States, and until every community had the means to supervise the movements of the tuberculous by a staff of visiting nurses and to isolate open cases in local sanitoria.

Public-Health Engineering.

Requirements of laws.—It is the duty of the State chemist to make a chemical and bacteriological analysis of water samples from town or school districts upon the request of local health officers when such water supply is suspected of being contaminated. Reports giving the results of such analyses are made to municipal health officers or other authorities concerned.

It is forbidden to pollute or obstruct any watercourse, lake, pond, marsh, or sewer so as to render same unwholesome to the locality.

For violation of this law there is provided a fine of not to exceed $300. Every such nuisance may be abated by the sheriff.

Any person who throws into any well or open sewer any refuse from slaughterhouses, privies, garbage, etc., may be punished by a fine of not less than $100 or more than $500 for each offense.

A city or city and county is granted authority to prevent the polultion of water in any reservoir, stream, and pipes included within the boundaries of mountain parks or boulevards, as well as the source from which the water is taken as far as 10 miles above the point from which it is diverted.

Requirements of regulations.—The protection of water supplies, the proper disposal of sewage and municipal wastes, and the elimination of the house fly are all provided for by regulations. In each instance a brief discussion is given pointing out the dangers that may arise from a neglect to take the proper precautions. The methods to be pursued in the various instances are formulated in a set of rules which are advisory in nature and not mandatory. They are intended as a guide to local authorities who desire to take action. At the same time the State board of health offers its assistance in working out the best methods to be used in the different localities.

The public utilities commission has formulated a set of rules making a standard for the purity of the water furnished for human consumption by corporations, private or municipal. The rules specify that such water should be free from disease-producing organisms and injurious chemical or physical substances and should be agreeable to the sight and smell. Water which rarely shows the presence of the bacillus coli group and which has a reasonably low bacteria count will ordinarily be considered safe.

The rules further require that the corporations must submit samples monthly to the State chemist for analysis. The result of the test must be recorded in triplicate, one copy to be furnished to the public utilities commission, one to the State board of health, and one to the corporation. Each corporation supplying water to a town of 5,000 or more inhabitants must provide suitable equipment for making tests for the presence of the colon bacillus and other bacteria, turbidity and suspended matter, and must make such tests at least once each week and report as above.

The rules require that when any test discloses the presence of the colon bacillus or a high bacteria count, the corporation must employ all reasonable means to make the water safe.

Methods of procedure.—At present the public health engineering activities of the State board of health are carried on by the medical inspector. The State chemist, who is an official of the University of Colorado, makes the necessary bacteriological and chemical examinations of water samples at the request of health authorities. This work is done in the laboratory of the University of Colorado, located at Boulder, Colo.

The table previously given shows that there were made by the medical inspector during the 12-month period ended June 30, 1916, 19 investigations on account of water supplies, sewage disposal, and trades wastes. During the same period the State chemist made an analysis of 304 samples of water. These figures were obtained from the records in the office of the State board of health.

Discussion.—The medical inspector has had some training and experience in public health engineering, but he is not a sanitary engineer, nor would a medical inspector actively engaged in epidemiological work have sufficient time to perform the duties of both offices.

It is agreed by all who have had experience that the work of a sanitary engineer has a most important bearing on the maintenance of the public health, therefore a public health engineering division in the State board of health, with a full-time sanitary engineer as its chief, could render most valuable services to the people of the State.

In order that the activities of the sanitary engineer shall be effective, he must work under a businesslike arrangement. Therefore all matters relating to the subject of public health engineering should be correlated and placed under his immediate supervision.

An important part of the work of a sanitary engineer is the analysis of water and sewage. In Colorado laboratory investigations have been taken away from the State board of health and placed with the State chemist, an official over whom the board of health has no control. Such a scheme will never prove satisfactory. A mere analysis is of little value. It is only by a proper interpretation of the results of analysis in connection with a field survey that practical use may be made of the findings, and as these matters devolve upon a sanitary engineeer he should have supervision over the laboratory in which the analyses are performed.

The sanitary engineer of the State board of health should act as the advisor to local communities in all matters relating to the water supply, the disposal of sewage, garbage, and other municipal wastes and the disposal of industrial wastes.

THE INSPECTION OF FOODS AND DRUGS.

Requirement of laws.—The laws relating to the manufacture and sale of foods and drugs conform very closely in their provisions to United States statutes and include the manufacture, sale, misbranding, and adulteration of foods and drugs, the sale of narcotic and habit forming drugs, and the maintenance of sanitation in places handling foods. These laws have been placed for their enforcement in the State board of health.

The State chemist, an official of the University of Colorado located at Boulder, is required to analyze samples of foods and drugs collected by inspectors of the food and drug division of the State board of health. The results of analysis must be transmitted by the State chemist to the pure food commissioner.

In addition to the above a law to maintain the purity of milk and milk products was passed in 1915 and placed for its enforcement in the State Agricultural College, and there is also a law to prevent the sale of meat from diseased animals and to provide for the maintenance of sanitation in slaughterhouses. This law has been placed for its enforcement in the office of the meat and slaughter plant inspector.

Requirements of regulation.—The regulations of the State board of health conform as closely as possible to those of the United States Department of Agriculture and govern the operations of those concerned in the enforcing or complying with the laws relating to foods and drugs.

Methods of procedure.—The food and drug division of the State board of health is in charge of an official designated as pure food commissioner. He has under him three food inspectors and one drug inspector. Part of the time of one clerk is given to the office of the pure food commissioner and part to the office of the secretary of the State board of health.

The inspectors are essentially field men. Their services are of maximum value when they are working in the smaller communities and away from headquarters. Unfortunately their activities in the field are limited because of an inadequate appropriation to defray travel expenses. The appropriation amounts to about $25 per man per month, including the travel expenses of the chief of the division. Such an amount does not permit of much field work.

Samples collected by the inspectors are paid for, and, where it is thought likely prosecution will follow, are sealed. They are sent to the State chemist for analysis. The report of the analysis is sent to the food commissioner and the sample labeled and retained for future use in court.

Prosecution against violators of the food and drug law can be brought by the State only in the criminal courts, and it is difficult to arouse the interest of the prosecuting attorney unless the violation

very clearly endangers the health of the people. Therefore when local ordinances, as well as State laws, are violated, the case is prosecuted before a local magistrate by the local food inspector upon evidence collected by the State inspector.

During the 12 months' period ended June 30, 1916, the inspectors of the food and drug division visited 347 towns. In these localities there were inspected 295 drug stores, 2,299 grocery and meat stores, 30 dining cars, and 2,842 miscellaneous establishments handling foods. A number of samples of foods and drugs were collected and sent to the State chemist for analysis, and a quantity of food products condemned and in some cases destroyed.

The work of the drug inspector includes a number of investigations relating to violations of the narcotic act in addition to the inspection of drug stores.

The same remarks that were made in regard to the analysis of water should be repeated here with equal emphasis as regards the analysis of foods and drugs. Such analyses should be made under the supervision of the official who is responsible for the enforcement of the food and drugs act. The food and drug laboratory should therefore be a part of the State board of health. That board could, in fact, operate such a laboratory at no greater amount than is now appropriated to the State chemist for the same purpose.

Control of milk supply.—The enforcement of the law to maintain the purity of milk and milk products has been placed for its enforcement with the State Agricultural College and not with the State board of health where it logically belongs, as the most important of all foods from the standpoint of public health.

The chief of the department of animal husbandry of the agricultural college has been made ex officio State dairy commissioner. He has not a sufficient number of inspectors, however, to exercise a supervision over the milk supply from all of its angles, and therefore he can devote special attention only to the creamery or to the products made from milk, trusting that each locality may be in a position to supervise the methods used in the production of milk and, when in need of assistance from the State, will request it. The methods used in the production of milk are the most important from the standpoint of the public health, and it is in a supervision of these methods that the inspectors of the food and drug division of the State board of health could cooperate with those of the agricultural college, by taking over the inspection of the producing farms in all places where there was no local inspection. It would be an easy matter for an inspector of the food and drug division, while working in a locality, to extend the scope of his inspections to include producing farms in the vicinity. As the State board of health is given supervision over the life and health of the people of the State, and as

the purity of the milk supply has an important bearing on public health, that board should formulate a set of rules in conformity with the State law providing for the methods to be used in the production of milk. The inspectors should receive some preliminary training relative to milk inspection and should realize that in the enforcement of milk regulations they are educators rather than police officials.

DISSEMINATION OF INFORMATION.

It has been the custom in the past for the State board of health to make a biennial report of its transactions. The last report, however, is an annual report for the year 1915. This report is an exceedingly valuable publication in that it contains a compilation of the laws of the State pertaining to the public health as well as all of the regulations of the State board of health. The preparation of this report represents an expenditure of much thought and energy, but its value more than compensates for the labor entailed.

The expense of publishing the report is paid out of a special appropriation of $800 for the biennial period.

No bulletins of a popular educational nature are issued. A few circulars of information to health officers have been published from time to time, relating to the control of diseases, and some of the laws have been reprinted.

The medical inspector takes advantage of every opportunity to give talks on public health to pupils of the public schools in the districts where he may be carrying on some investigation, or to address other gatherings upon request. Lectures are not infrequently given by the secretary or other members of the State board of health.

The State board of health owns two moving-picture films which it loans to those communities desirous of exhibiting them.

When the State board of health has more funds it is suggested that bulletins of a popular nature be issued to be used especially in instructing the pupils of the public schools.

It would also be advisable for the State board of health to acquire a public-health exhibit to be shown in the various communities of the State, accompanied by illustrated lectures.

HEALTH SUPERVISION OF SCHOOLS.

The State board of health has neither the money nor the authority to engage in this class of work, but is cognizant of its importance, and has therefore promulgated regulations concerning the hygiene of schools. These regulations provide for the proper construction of school buildings as regards toilet facilities, heating, lighting, ventilation, water supply, seating, etc., and the care of the building, and prohibit the employment of teachers or janitors suffering from a

communicable disease, especially tuberculosis or syphilis. The regulations also formulate rules to be used by local authorities in enforcing the law providing for the examination of pupils.

This law is briefly as follows:

The State superintendent of public instruction is required to provide the necessary test cards, blanks, record books, appliances, etc.

The teacher or principal of every school is required, during the first month of each year, to test the sight, hearing, and breathing of all pupils, keep a record of the same, and make a written report to the State superintendent.

Each teacher must also report any mental, moral, or physical defect, as soon as such defect is noticed, to the principal or county superintendent of schools, who in turn must notify the parents and recommend that the child be thoroughly examined and treated by a competent physician as soon as possible.

In the case of indigents the examination may be made by the county physician.

Discussion.—Any law providing for a health supervision of school children is a step in the right direction, although the one summarized above is far from ideal.

It is not the intention to recommend a district health organization for Colorado. Without such an organization the State board of health could take no active part in rural school work except in an advisory manner. It might be suggested, however, that a provision requiring school districts to employ one or more school nurses would greatly enhance the value of a system of school inspection. As mentioned above, the State board of health could do much toward educating the children of the public schools in a correct knowledge of public health matters by publishing a series of bulletins to be used in the schools as a weekly lesson in hygiene.

APPROPRIATIONS AND EXPENSES.

In compiling a tabulation of the itemized expenses of the State board of health, the 12 months' period between July 1, 1915, and June 30, 1916, has been used. This is not the fiscal year used in the State of Colorado.

The tabulation shows that during this 12 months' period the State board of health expended $19,346.45, which is $304 less than they are allowed for each fiscal year. It does not signify that at the end of the biennial period there will be a balance in favor of the health organization. The apparent balance indicated in the tabulation may be said to represent the money which is held in reserve for travel expenses in case of emergencies. This amount will be expended before the end of the biennial period, at which time all appropriations expire and all balances revert to the treasury.

Appropriations are made to the State board of health for a biennial period. The appropriation act specifies the purpose for which the

money is to be used. For the biennial period 1915 and 1916, the act reads as follows:

	1915	1916
Secretary State board of health	$1,203.30	$1,000.00
Traveling expenses members and inspectors	750.00	750.00
Bacteriologist	1,500.00	1,500.00
Clerk vital statistics	1,200.00	1,200.00
Clerk and stenographer	1,200.00	1,200.00
Assistant statistician	1,200.00	1,200.00
Transcribing clerk	1,200.00	1,200.00
Medical inspections	900.00	900.00
Pure food commissioner	2,208.30	2,000.00
Pure food and drug inspector	1,500.00	1,500.00
Food inspectors (three), at $1,200	3,600.00	3,600.00
Laboratory supplies and expenses	500.00	500.00
Traveling expenses commissioner and food inspectors	1,500.00	1,500.00
Fund for bulletin		800.00

The total for the biennial period represents an average yearly appropriation of $19,650 and includes the amount required to enforce the food and drug act. A glance at the tabulation shows that to support the food and drug division of the State board of health cost $9,917.16, or a little more than twice the amount that was required to carry on all other activities of the health organization. In many States the food and drug work is supported by special appropriation and therefore does not come out of the funds for strictly public health purposes.

The assessed valuation of taxable property in 1915 was $1,249,199,210. Believing this figure to be an overvaluation, a reduction of $24,000,000 was made during the year 1916, thus decreasing the assessed valuation of property to $1,225,199,210.

The constitution of the State of Colorado permits a tax levy of not to exceed 4 mills on each dollar for the maintenance of the entire State government. During the year 1915 the tax levy was only $2\frac{1}{10}$ mills, which is estimated to produce a revenue of $2,623,318. During the year 1916 the tax levy was reduced to $2\frac{7}{100}$ mills, which will produce a revenue lower than that of 1915.

The amount of the tax levy that may be used for general purposes, i. e., the support of the legislative, executive, and judicial branches of the Government, is 0.659976 mill which is estimated to produce for the year 1915, $824,441. If to this amount there be added the revenues derived from other sources, as, for instance, the inheritance tax, there will be a total income for general purposes of $1,427,627. Calculating the amount which should go to the State board of health on the 2 per cent basis, there would be $28,552, an amount inadequate to meet the requirements of a modern health department if the work of the food and drug division is to be included.

The amount required to effect an organization in Colorado capable of carrying on all of the activities required of a modern State board

of health is $35,500, or approximately 2½ per cent of the revenue that may be used for general purposes. This represents a tax levy of but three-one hundredths of 1 mill. It should be expended about as follows:

One State health officer, at not less than	$3,500
One medical inspector, at not less than	2,500
One sanitary engineer, at not less than	2,000
One chief of the division of vital statistics, at not less than	1,500
One bacteriologist, at not less than	1,800
One chief of the food and drug division, at not less than	2,000
One chemist, at not less than	2,000
Three food inspectors, at $1,200	3,600
One drug inspector	1,500
Three clerks and stenographers, at $1,200	3,600
One stenographer	900
One laboratory attendant	720
Traveling expenses	4,500
Maintenance of laboratory	900
Printing, publications, exhibits, etc	2,500
Office expenses, incidental expenses, etc	1,980
	35,500

The above-described scheme contemplates placing the executive officer of the State board of health, the medical inspector, and the bacteriologist on a full-time basis, and adding four additional employees to the force—namely, a sanitary engineer, a chemist, a clerk and a laboratory attendant.

Tabulation of expenditures of the State board of health for the 12 months' period ended June 30, 1916.

	Board of health.	Secretary to the board of health.	General administration.	Epidemiological.	Sanitary engineering.	Educational.	Diagnostic laboratory.	Vital statistics.	Foods and drugs.	Licensing of hospitals.	Total.
Advertising									$1.60		$1.60
Badges									2.00		2.00
Binding								$127.50			127.50
Cameras and repairs									1.25		1.25
Drugs, chemicals, and disinfectants									1.85		1.85
Emergency services			$22.00	$51.70				100.00	32.50		206.20
Express, freight, and drayage					$2.50				3.37		5.87
Flash light and batteries									3.85	$1.75	5.60
Laboratory supplies							$86.51				86.51
Miscellaneous									3.75		3.75
Office supplies			17.10						1.65		18.75
Postage			76.00				24.00	15.00	4.60		119.60
Printing				29.00		[1] $786.01	3.50	408.70	138.26		1,365.47
Purchase of samples									88.31		88.31
Salaries		$1,000.00		2,100.00			1,500.00	2,400.00	8,300.00		15,300.00
Specimen outfits					.30		69.00				69.30
Stationery			70.00	4.10					18.65		92.75
Telegraph and telephone			89.79	1.50			1.93		24.59		117.81
Traveling expenses	$33.05			143.99	161.01			22.30	1,290.93	70.95	1,722.23
Typewriter and repairs			10.10								10.10
	33.05	1,000.00	284.99	2,330.29	163.81	786.01	1,684.94	3,073.50	9,917.16	72.70	19,346.45

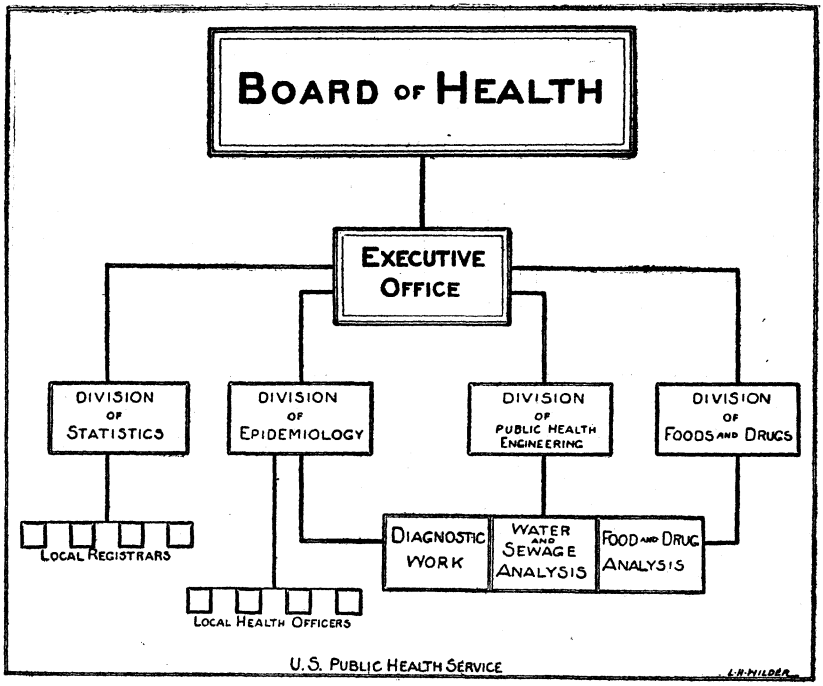
[1] Annual report or bulletin.

RECOMMENDATIONS.

After a thorough study of the State board of health and careful consideration of the public health needs of the State, the following recommendations are offered:

That the secretary of the State board of health be placed on a full-time basis; that he receive a salary of not less than $3,500 per year; and that he hold his office as long as he renders efficient services to the State.

That for administrative purposes the State health organization be divided into the board of health, the executive office, a division



Scheme of reorganization suggested for the State Board of Health of Colorado.

of epidemiology, a division of public health engineering, a division of statistics, and a division of foods and drugs.

That the medical inspector be employed on a full-time basis and placed in charge of the division of epidemiology; that he receive a salary of not less than $2,500 per year; and that he hold his office as long as he renders efficient services to the State.

That a full-time sanitary engineer be placed in charge of the division of public health engineering; that he receive a salary of not less than $2,000 per year; and that he hold his office as long as he renders efficient services to the State.

That a full-time bacteriologist be employed to perform the technical work of the diagnostic laboratory, to receive a salary of $1,800, and to hold office as long as efficient services are rendered to the State.

That the clerk of vital statistics be promoted to the position of chief of the division of statistics; that he receive a salary of not less than $1,500 per year; and that he hold office as long as he renders efficient services to the State.

That a full-time chemist be employed to perform the chemical work required in the analysis of water, sewage, foods, and drugs, at a salary of $2,000 per year, and that he hold office as long as he renders efficient services to the State.

That in addition to the above the personnel of the State department of health be increased by the addition of one laboratory attendant and one clerk.

That all of the employees of the health department be full time and hold their office during efficiency.

That the bureau of epidemiology be made responsible for the collection of information regarding the prevalence of disease and for the enforcement of the State laws and regulations relating to morbidity reports, the control of preventable diseases, the work of the diagnostic laboratory, and the supervision of the activities of local health authorities.

That the bureau of public health engineering be made responsible for the activities concerned in the maintenance of the purity of water supplies, the disposal of sewage, garbage, and trades wastes, and the laboratory work entailed in the analysis of water and sewage.

That the bureau of statistics be made responsible for the registration of births and deaths, and the compilation and tabulation of data relating thereto.

That a laboratory be equipped by the State board of health to perform all of the bacteriological or chemical work necessary in the diagnosis of disease and the examination of milk, water, and sewage and foods and drugs.

That the work of the laboratory be divided into three classes—the diagnostic work, water and sewage analyses, and the analyses of foods and drugs—and that for administrative purposes these various classes of work be placed under the supervision of the medical inspector, the sanitary engineer, and the pure food commissioner, respectively.

That the diagnostic work of the laboratory be extended both in amount and scope, so that the physicians and the health officers in the State may have greater facilities to assist them in the diagnosis of communicable diseases.

That energetic efforts be made to secure the notification of reportable diseases and complete birth and death registration.

That educational literature on the different subjects of public health be published by the State board of health and distributed among the citizens of the State and to be used especially for instructing pupils of the public schools.

That a public health exhibit be acquired by the State board of health and exhibited in the different localities of the State, accompanied by lectures and moving pictures.

That larger quarters for the State board of health be provided in the statehouse at Denver.

That a record of the expenditures be kept by the State board of health, according to the nature of the expense and the bureau incurring it, so that the cost of maintaining any bureau, or the cost of any activity, may be determined without delay.

That the food and drug division of the State board of health maintain a sanitary supervision over the farms at which milk is produced, and that the State board of health promulgate the necessary regulations to insure the production of clean milk.

That not less than $35,500 per year be appropriated to the State board of health to be used in the following manner at the discretion of the State board of health:

One secretary, State board of health	$3,500
One medical inspector	2,500
One sanitary engineer	2,000
One chief of the division of vital statistics	1,500
One bacteriologist	1,800
One chief of the food and drug division	2,000
One chemist	2,000
Three food inspectors, at $1,200 each	3,600
One drug inspector	1,500
Three clerks and stenographers, at $1,200 each	3,600
One stenographer	900
One laboratory attendant	720
Travel expenses	4,500
Maintenance of laboratory	900
Printing, publications, exhibits, etc	2,500
Office expenses, incidental expense, etc	1,980
	35,500